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Scientific & Technical Information Center

Search Report
EIC 2800

STIC Database Tracking Number: 262504

To:	From:
To: MICHAEL MASKELL **Location: JEF-3B29** **Art Unit: 2881** **Friday, June 06, 2008** **Case Serial Number: 10/567138**	**From: MICHAEL OBINNA** **Location: EIC2800** **JEF-4B68 / JEF-4A58** **Phone: (571)272-2663** **michael.obinna@uspto.gov**

Search Notes

Dear Examiner MASKELL:

RE: **HIGH FREQUENCY DRIVEN HIGH PRESSURE MICRO DISCHARGE**

Attached are edited search results from the patent and non-patent databases.

The tagged items are some of the results worth reviewing.

I recommend that you browse all the results.

If you would like more searching on this case, or if you have questions or comments, please let me know.

Respectfully,

Michael Obinna

sira
Search and Information Resources Administration

VOLUNTARY SEARCH FEEDBACK

Art Unit _____ App./Serial # _____

Relevant prior art found

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest
- ☐ Helped better understand invention
- ☐ Helped better understand state of the art in technology

Types ☐ Foreign Patent(s) ☐ Non-Patent Literature

Relevant prior art not found

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining the patentability or understanding of the invention.

COMMENTS (click below to type)

Questions about the scope or the results of the search?
Contact your EIC searcher or EIC Supervisor.

Please submit completed form to your EIC

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12/07

Today's Date _____

Additional Notes if applicable (please indicate all actions including emails, phone calls, and individuals assisting):

_____

_____

_____

262604

EIC 2800
FAST & FOCUSED SEARCH

Scientific & Technical Information Center

Today's Date JUN 5 2008

This search cannot be started unless you:
A. Attach a copy of your EAST/WEST strategy.
B. Conduct an interview with your searcher.

Name Michael Maskell

AU/Org. 2881 Employee #

Bld.&Rm.# 3B29 Phone x03210

Priority App. Filing Date

Case/App. # 10/567138

Format for Search Results
EMAIL ✓ PAPER

If this is an Appeals case, check here ☐

Describe this invention in your own words Relation between concentration, pressure, power, and their effect on efficiency of an excimer lamp. [redacted]

Synonyms

Additional Comments

Please hand deliver completed form to your TIS.

STIC USE ONLY

Searcher Michael Obrien Date Completed 6/16/2008

Phone EXT 22663 Sources DIALOG; STN; IEEE

11/07

6/6/2008 11:40:46 AM
6/6/2008 12:17:37 PM

[File 2] INSPEC 1898-2006/Jan W2
[File 6] NTIS 1964-2006/Jan W4
[File 8] Ei Compendex(R) 1970-2006/Jan W4
[File 34] SciSearch(R) Cited Ref Sci 1990-2006/Jan W4
[File 434] SciSearch(R) Cited Ref Sci 1974-1989/Dec
[File 35] Dissertation Abs Online 1861-2006/Jan
[File 65] Inside Conferences 1993-2006/Jan W5
[File 99] Wilson Appl. Sci & Tech Abs 1983-2006/Apr
[File 144] Pascal 1973-2006/Jan W2
[File 23] CSA Technology Research Database 1963-2006/Jan
[File 103] Energy SciTec 1974-2006/Jan B1
[File 31] World Surface Coatings Abs 1976-2006/Jan
[File 95] TEME-Technology & Management 1989-2006/Jan W5
[File 60] ANTE: Abstracts in New Tech & Engineer 1966-2006/Jan
[File 293] Engineered Materials Abstracts 1966-2006/Jan
[File 239] Mathsci 1940-2005/Feb
[File 256] TECINFOSOURCE 82-2005/DEC

Set	Items	Description
S1	5691763	S (GAS OR GASEOUS OR EXCIMER??? OR VACUUM OR ULTRAVIOLET OR ULTRA()VIOLET OR DISCHARG???)(3N)(LASER??? OR LAMP??? OR LIGHT??? OR EMIT????? OR EMIS?????) OR LASER??? OR LAMP??? OR LIGHT???
S2	20097909	S RELATION????? OR EXPRESS???? OR FORMULA??????? OR CALCULAT????? OR EQUAT???? OR COMPUTING OR COMPUTATION OR ITERAT????? OR INTERPOLAT????
S3	22665079	S CONCENTRATION OR STRENGTH OR POTENCY OR POWER???? OR PRESSURE OR VOLT??? OR WATT???? OR ENERGY OR RADIAT????
S4	1383609	S (OPTIM????? OR EFFECT????? OR EFFICIEN????? OR ACCURA???????? OR MAXIM????? OR BETTER OR EXCEL????? OR IMPROV?????? OR INCREAS???? OR HIGH OR HIGHER OR ENHANC???? OR GOOD OR QUALIT???? OR PERFORM???? OR OPERAT????)(3N)(LASER??? OR LAMP??? OR LIGHT??? OR EMIT????? OR EMIS????? OR EXCIMER??? OR ULTRAVIOLET OR ULTRA()VIOLET OR DISCHARG???)
S5	3033013	S (RARE OR NOBLE OR INERT)(2N)(GAS OR GASES) OR HELIUM OR HE OR NEON OR NE OR ARGON OR AR OR KRYPTON OR KR OR XENON OR XE OR RADON OR RN OR HALOGEN??? OR FLUORINE OR FL
S6	10524	S S1 AND S2 AND S3 AND S4 AND S5
S7	8370	S S1(3N)S2(3N)S3(3N)S4
S8	857	S S7 AND S5
S9	98038	S (CHAMBER OR HOUS???? OR ENCLOS???? OR CONTAIN???? OR VESSEL???)(3N)(ELECTROD???? OR CONDUCT???? OR PLATE??? OR PROB???)
S10	0	S S8 AND S9
S11	1	S S7 AND S9
S12	17	S S6 AND S9
S13	10	RD (unique items)
S14	653	S S1 AND S2 AND S3 AND S9
S15	104	S S14 AND S4
S16	5	S S1(3N)S2(3N)S3(3N)S9
S17	4	RD (unique items)
S18	16	S (S1(3N)S2(3N)S3 AND S9)
S19	12	RD (unique items)
S20	135	S EXCIMER()LASER AND (S2(3N)S3(3N)S4)
S21	51	S S20 AND S5
S22	0	S S21 AND S9
S23	0	S S20 AND S9
S24	7	S S20(3N)S5
S25	5	RD (unique items)
S26	10	S S13 NOT S11
S27	4	S S17 NOT (S11 OR S13)
S28	11	S S19 NOT (S11 OR S13 OR S17)
S29	5	S S25 NOT (S11 OR S13 OR S17 OR S19)

26/9/8 (Item 2 from file: 35) **Links**
Dissertation Abs Online

779060 ORDER NO: AAD82-11437

AN INVESTIGATION ON DIRECT CURRENT EXTRACTION FROM MICROWAVE INDUCED PLASMA

Author: LOPUCH, STANISLAW LEONARD
Degree: PH.D.
Year: 1981
Corporate Source/Institution: MARQUETTE UNIVERSITY (0116)
Source: Volume 4212B of Dissertations Abstracts International.
PAGE 4887 . 176 PAGES
Descriptors: ENGINEERING, ELECTRONICS AND ELECTRICAL
Descriptor Codes: 0544

It has been found that if two metal electrodes are immersed in a microwave induced plasma, under certain conditions, a DC potential difference develops across the electrodes, and a DC current flows through a resistor externally connected to the electrodes. This phenomenon suggests a method of microwave-to-DC **energy** conversion.

Experimental investigations were made using mainly a commercial **neon** indicator **lamp** inserted into a waveguide and irradiated by a microwave signal of frequency 2.45 GHz. It was found that the magnitude of extracted current and its polarity could be changed by adjusting the impedance of the RF load of the **lamp**. Under **optimal** conditions, the **lamp** was ignited at about 0.5 W of incident microwave **power**, and 2 mA DC current into 500 Ohms DC load was obtained at 10 W of incident microwaves.

A theoretical model of the process consistent with the experimental data is proposed. It is based on the existence of a nonuniform microwave electric field distribution between extracting electrodes and the formation of unequal plasma sheaths around electrodes.

Numerical **computation** of the microwave electric field distribution for the particular structure of the **NE**-2 **lamp** is presented in the dissertation. The resultant field has been found to be highly nonuniform, and the position of its maximum has been determined to vary while adjusting the RF load reactance.

Such a nonuniform field produces a gaseous plasma characterized by an adequately nonuniform distribution of particle temperature and **concentration**. If the microwave electric fields at electrode surfaces are not equal, charged particles of the plasma diffuse toward the electrodes at different rates. This gives rise to different plasma sheaths around the electrodes, and when the external DC circuit is open, a difference in plasma sheath potentials appears across the electrodes. When the DC circuit is loaded, there is a flow of electrons through the external circuit from the high field electrode to the low field electrode. This process explains the origin of the extracted DC current. The value of the extracted current is determined by the microwave electric field distribution, geometry of the **electrodes** and discharge **chamber**, and properties of the gas used.

The conclusion of this work is that microwave-to-DC conversion by a microwave induced plasma is possible. Although the **power** handling capacity and the **energy** conversion efficiency of the **NE**-2 **lamp** and other laboratory-built structures were not satisfactory, some design criteria have been developed to improve both of them.

29/9/1 (Item 1 from file: 2) **Links**
Fulltext available through: STIC Full Text Retrieval Options
INSPEC

04357913 **INSPEC Abstract Number:** A89047414, B89031688
Title: Output characteristics of Ar excimer laser with various cavity mirrors
Author Takeuchi, K.; Kurosawa, K.; Sasaki, W.; Takigawa, Y.; Yoshida, K.; Fujiwara, E.; Kato, Y.
Author Affiliation: Dev. Center, Shin Meiwa Ind. Co. Ltd., Nishinomiya, Japan
Journal: Review of Laser Engineering vol.16, no.10 p. 691-8

Publication Date: Oct. 1988 **Country of Publication:** Japan
CODEN: REKEDA **ISSN:** 0387-0200

Language: Japanese **Document Type:** Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: Quartz glass (SiO/sub 2/) silicon single crystal (Si) and molybdenum single crystal (Mo) have been tested for the cavity reflector of an **argon excimer laser** which supplies intense coherent radiation at 126 nm. These mirrors have been used with a combination of a MgF/sub 2/ output coupler. The laser output energy was found to be limited by damage threshold of the mirrors. The maximum output energy of 50 mJ per pulse was obtained with the cavity composed of a Mo reflector and a MgF/sub 2/ coupler. No damage was observed on the Mo mirror surface. The duration of the laser output pulse depends on the **argon** gas **pressure** and also the reflectors. The mirror damage is discussed with **relation** to pulse shortening observed in **high power rare- gas excimer** lasers of **Xe, Kr** and Ar. (14 Refs)
Subfile: A B
Descriptors: argon; excimer lasers; laser accessories; laser beams; mirrors
Identifiers: excimer laser; cavity mirrors; cavity reflector; coherent radiation; output coupler; mirrors; 126 nm; Ar; Si; Mo; MgF/sub 2/; SiO/sub 2/
Class Codes: A4260H (Laser beam characteristics and interactions); A4255G (Excimer lasers); B4330 (Laser beam interactions and properties); B4320C (Gas lasers); B4320M (Laser accessories and instrumentation)
Chemical Indexing:
SiO2 bin - O2 bin - Si bin - O bin (Elements - 2)
Ar el (Elements - 1)
Si el (Elements - 1)
Mo el (Elements - 1)
MgF2 bin - F2 bin - Mg bin - F bin (Elements - 2)
Numerical Indexing: wavelength 1.26E-07 m

29/9/4 (Item 1 from file: 8) **Links**
Fulltext available through: STIC Full Text Retrieval Options
Ei Compendex(R)

07916656 **E.I. No:** EIP97113942822
Title: One dimensional kinetics study on E-beam pumped triatomic Kr//2F excimer laser

Author: Feng, Guogang; Wang, Pu
Corporate Source: Inst of Atomic Energy, Beijing, China
Source: Qiangjiguang Yu Lizishu/High Power Laser and Particle Beams v 9 n 2 May 1997. p 293-297
Publication Year: 1997
CODEN: QYLIEL **ISSN:** 1001-4322
Language: Chinese
Document Type: JA; (Journal Article) **Treatment:** A; (Applications); T; (Theoretical)
Journal Announcement: 9803W4
Abstract: Using one dimensional kinetics model, a theoretical simulation has been studied on e-beam pumped triatomic **Kr**//2F **excimer laser** in **Ar**/**Kr**/F//2 mixtures. The **calculation** results revealed that the experimental direction to **increase Kr**//2F **excimer laser energy** is reasonable. The **calculated** laser output **energy** is up to mJ. All **calculation** results have been verified in experiments. (Edited author abstract) 9 Refs.
Descriptors: *Excimer lasers; Electron beams; Laser beam effects; Electron beam pumping; Reaction kinetics; Computer simulation
Identifiers: Krypton fluoride excimer lasers
Classification Codes:
744.2 (Gas Lasers); 744.8 (Laser Beam Interactions); 723.5 (Computer Applications)
744 (Lasers); 723 (Computer Software)
74 (OPTICAL TECHNOLOGY); 72 (COMPUTERS & DATA PROCESSING)

6/6/2008 12:40:09 PM
6/6/2008 01:04:53 PM

[File 344] Chinese Patents Abs Jan 1985-2006/Jan
[File 347] JAPIO Dec 1976-2007/Mar(Updated 0803028)
[File 350] Derwent WPIX 1963-2008/UD,UM &UP=200831
[File 371] French Patents 1961-2002/BOPI 200209

Set	Items	Description
S1	2544152	S (GAS OR GASEOUS OR EXCIMER??? OR VACUUM OR ULTRAVIOLET OR ULTRA()VIOLET OR DISCHARG???)(3N)(LASER??? OR LAMP??? OR LIGHT??? OR EMIT????? OR EMIS?????) OR LASER??? OR LAMP??? OR LIGHT???
S2	2803911	S RELATION????? OR EXPRESS???? OR FORMULA??????? OR CALCULAT????? OR EQUAT???? OR COMPUTING OR COMPUTATION OR ITERAT????? OR INTERPOLAT????
S3	6625413	S CONCENTRATION OR STRENGTH OR POTENCY OR POWER???? OR PRESSURE OR VOLT??? OR WATT???? OR ENERGY OR RADIAT????
S4	604249	S (OPTIM????? OR EFFECT????? OR EFFICIEN????? OR ACCURA???????? OR MAXIM????? OR BETTER OR EXCEL????? OR IMPROV?????? OR INCREAS???? OR HIGH OR HIGHER OR ENHANC???? OR GOOD OR QUALIT???? OR PERFORM???? OR OPERAT????)(3N)(LASER??? OR LAMP??? OR LIGHT??? OR EMIT????? OR EMIS????? OR EXCIMER??? OR ULTRAVIOLET OR ULTRA()VIOLET OR DISCHARG???)
S5	1360721	S (RARE OR NOBLE OR INERT)(2N)(GAS OR GASES) OR HELIUM OR HE OR NEON OR NE OR ARGON OR AR OR KRYPTON OR KR OR XENON OR XE OR RADON OR RN OR HALOGEN??? OR FLUORINE OR FL
S6	258373	S (CHAMBER OR HOUS???? OR ENCLOS???? OR CONTAIN???? OR VESSEL???)(3N)(ELECTROD???? OR CONDUCT???? OR PLATE??? OR PROB???)
S7	2479	S IC=(H01J-017/36 OR H01J-011/04 OR H05B-037/00 OR H05B-041/00)
S8	2264	S MC=(U11-C04H1 OR V05-E03)
S9	310	S S1 AND S2 AND S3 AND S4 AND S5 AND S6
S10	2	S S9 AND S7
S11	0	S S9 AND S8
S12	3710	S S1(3N)S2(3N)S3
S13	1412	S S12 AND S4
S14	461	S S12(3N)S4
S15	70	S S14 AND S5
S16	6	S S15 AND S6
S17	8	S S12 AND S7
S18	9	S S12 AND S8
S19	3	S S14 AND S7
S20	2	S S14 AND S8
S21	175	S S1(3N)S2(3N)S3(3N)S5
S22	74	S S21 AND S4
S23	17	S S22 AND S6
S24	1	S S23 AND S7
S25	0	S S23 AND S8
S26	1	S S22 AND S7
S27	0	S S22 AND S8
S28	1	S S21 AND S7
S29	1	S S21 AND S8
S30	6	S S16 NOT S10
S31	7	S S17 NOT (S10 OR S16)
S32	9	S S18 NOT (S10 OR S16 OR S17)
S33	0	S S19 NOT (S10 OR S16 OR S17 OR S18)
S34	0	S S20 NOT (S10 OR S16 OR S17 OR S18 OR S19)
S35	0	S S24 NOT (S10 OR S16 OR S17 OR S18 OR S19 OR S20)
S36	0	S S26 NOT (S10 OR S16 OR S17 OR S18 OR S19 OR S20 OR S24)
S37	0	S S28 NOT (S10 OR S16 OR S17 OR S18 OR S19 OR S20 OR S24 OR S26)
S38	1	S S29 NOT (S10 OR S16 OR S17 OR S18 OR S19 OR S20 OR S24 OR S26 OR S28)
S39	13	S S23 NOT (S10 OR S16 OR S17 OR S18 OR S19 OR S20 OR S24 OR S26 OR S28 OR S29)

10/9/1 (Item 1 from file: 350) **Links**
Fulltext available through: Order File History
Derwent WPIX

0006983858 & & *Drawing available*
WPI Acc no: 1994-311372/199439
XRPX Acc No: N1994-245124
Operation of a gas-discharge lamp - uses series of voltage pulses across electrodes, with pulse amplitude and mark-space ratio depending on gas pressure
Patent Assignee: HITZSCHKE L (HITZ-I); PATENT TREUHAND GES ELEKTRISCHE (PATT); PATENT-TREUHAND-GES ELEKTRISCHE GLUEHLAM (PATT); VOLLKOMMER F (VOLL-I)
Inventor: HITZSCHKE L; MUELLER U; MULLER U; SCHMIDT D; VOLLKOMMER F; ZACHAU M

Patent Family (35 patents, 16 & countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
DE 4311197	A1	19941006	DE 4311197	A	19930405	199439	B
WO 1994022975	A1	19941013	WO 1994DE382	A	19940405	199441	E
WO 1994023442	A1	19941013	WO 1994DE380	A	19940405	199441	E
CZ 199502421	A3	19960717	CZ 19952421	A	19940405	199637	E
EP 733266	A1	19960925	EP 1994911103	A	19940405	199643	E
			WO 1994DE380	A	19940405		
EP 738311	A1	19961023	EP 1994911105	A	19940405	199647	E
			WO 1994DE382	A	19940405		
JP 8508307	W	19960903	JP 1994521546	A	19940405	199704	E
			WO 1994DE382	A	19940405		
JP 8508363	W	19960903	JP 1994521545	A	19940405	199704	E
			WO 1994DE380	A	19940405		
US 5604410	A	19970218	WO 1994DE380	A	19940405	199713	E

Alerting Abstract DE A1
A **gas-discharge lamp radiating** incoherent **light** has the electrodes fed by a series of **voltage** pulses whose shape varies with time, between which are periods of zero **voltage**. The pulse amplitudes equal the restrike **voltage**. The duration of the pulses and the spaces between them vary according to the gas filling, the arc length, the dielectric layers between the electrodes and the gas and the electrode configuration. The pulse duration in particular lies between .01 and 10 microseconds whereas the product of pulse duration and gas **pressure** lies between .01 and 10 Pascal- seconds. The pulse amplitude also depends on the same factors and in particular, lies between .01 and 1 **volt** per centimetre of arc length per Pascal **pressure**.
ADVANTAGE - Improved **radiation** efficiency.

Title Terms /Index Terms/Additional Words: OPERATE; GAS; DISCHARGE; **LAMP**; SERIES ; **VOLTAGE**; PULSE; ELECTRODE; AMPLITUDE; MARK; SPACE; RATIO; DEPEND; **PRESSURE**

Claim:

1. In combination with a source of vacuum ultraviolet (VUV) broad band molecular excited radiation of wavelengths shorter than 200 nm, which radiation is generated by Xe_2^* excimer radiation,
   - fluorescent materials for illumination purposes excitable by said VUV molecular excited Xe_2^* excimer radiation, comprising
   - a host lattice and at least one dopant substance, wherein the dopant substance contains at least one activator and luminesces in the visible range of the optical spectrum,
   - wherein,
   - for efficient excitation by said Xe_2^* excimer radiation, the fluorescent material comprises a mixed borate in accordance with the general formula
   - $(Y_xGd_yEu_z)BO_3$,
   - where the following relations apply: 0>=x>=0.99, 0>=y>=0.99, 0.01>=z>=0.2, and
   - x, y and z are in the ranges of 0.55>=x>=0.87, 0.1>=y>=0.3 and 0.03>=z>=0.15, and x+y+z≏1.

30/9/1 (Item 1 from file: 347) **Links**
Fulltext available through: Order File History
JAPIO

05332369 **Image available**

FLAT SURFACE DISCHARGE LIGHT EMISSION ELEMENT

Pub. No.: 08-287869 [JP 8287869 A]
Published: November 01, 1996 (19961101)
Inventor: URAKABE TAKAHIRO
HARADA SHIGEKI
HOSHIZAKI JUNICHIRO
NISHIKATSU TAKEO
KANO MASAO
Applicant: MITSUBISHI ELECTRIC CORP [000601] (A Japanese Company or Corporation), JP (Japan)
Application No.: 07-082771 [JP 9582771]
Filed: April 07, 1995 (19950407)
International Class: [6] H01J-061/30; H01J-061/067; H01J-061/16; H01J-061/42
JAPIO Class: 43.4 (ELECTRIC POWER -- Applications); 44.9 (COMMUNICATION -- Other)
JAPIO Keyword: R011 (LIQUID CRYSTALS)

ABSTRACT

PURPOSE: To provide a uniform surface **light emission** of **high light emission efficiency** by specifying **relation** between **pressure** of discharge gas in a discharge container including **xenon**, distance between a front and back glass boards, a lighting frequency, and input power.

CONSTITUTION: A back glass board 2 provided with a back electrode 5 and back phosphor 17 and a front glass board 3 provided with a transparent front electrode 6 and front phosphor are put to face each other at a distance, and a sealing member 14 is disposed at a peripheral part to form a discharge space 8. In this discharge space 8, **xenon** or mixed gas of it is enclosed, so light is emitted by gas discharge between both **electrodes**. In a discharge **container** 1 of this flat surface discharge light emission element, gas pressure P(Pa) of **xenon** or the like, distance G(m) between inner surfaces of the boards, lighting frequency f(Hz), and input power D(W/m(sup 2)) are set to satisfy $20<PG<53.2$, $D/f<=0.025$.

(FILE 'HOME' ENTERED AT 12:41:15 ON 06 JUN 2008)

FILE 'CAPLUS' ENTERED AT 12:41:50 ON 06 JUN 2008

L1 17625 SEA ABB=ON PLU=ON EXCIMER LASER

L2 223959 SEA ABB=ON PLU=ON (RELATION####### OR FORMULA########## OR EQUAT######## OR EXPRESS####### OR ITERAT####)(3A)(POWER OR PRESSURE OR CONCENTRATION OR STRENGTH OR POTENCY OR WATT##### OR ENERGY)

L3 1042 SEA ABB=ON PLU=ON (EFFICIEN######## OR EFFECT######## OR IMPROV##### OR BETTER######### OR GOOD OR PERFORM#######)(3A)(EXCIMER LASER)

L4 218720 SEA ABB=ON PLU=ON HALOGEN OR (RARE OR INERT OR NOBLE)(3A)GAS

L5 0 SEA ABB=ON PLU=ON L1 AND L2 AND L3 AND L4

L6 2 SEA ABB=ON PLU=ON L1 AND L2 AND L3

L7 6 SEA ABB=ON PLU=ON L1(3A)L2

L8 1042 SEA ABB=ON PLU=ON L1(3A)L3

L9 2 SEA ABB=ON PLU=ON L8 AND L2

L10 77 SEA ABB=ON PLU=ON L1 AND L2

D L6 IBIB ABS 1-2

L11 6 SEA ABB=ON PLU=ON L7 NOT L6

D L11 IBIB ABS 1-6

L12 0 SEA ABB=ON PLU=ON L9 NOT (L6 OR L7)

FILE 'STNGUIDE' ENTERED AT 12:49:55 ON 06 JUN 2008